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| <p>(54) Title: AUTOMATED SOFTWARE METERING OF DIGITAL PAYLOADS</p> <p>(57) Abstract</p> <p>A system (310, 311) monitors a data payload (1010, 1011, 1012, 1013, 1014) that is being transmitted in a secure form over the Internet and provides rate computations (310) for such payloads (1010, 1011, 1012, 1013, 1014) based on the size of the data (305). A data container (1000) may be implemented as a digital envelope (1000) with the bitmap (digital picture) of a stamp (1005). The current rate for the data container (1000) is shown on the stamp (1005) and is dynamically updated as data files (1010, 1011, 1012, 1013, 1014) are added (303, 304) to the envelope (1000). The overall cost (310) is a function of the applied rate card, the size of the data (305) and the type of security services provided (302).</p> | | | |
| <pre> graph TD 301[301 Open Envelope/Display Stamp User is identified] --> 302[302 Get Quality of Service desired] 302 --> 303[303 Add/Remove Destination] 303 --> 304{304 Add/Remove Destination?} 304 -- No --> 307[307 Update Display Stamp] 304 -- Yes --> 308{308 Add/Remove documents?} 308 -- Yes --> 309[309 Seal Electronic Envelop] 308 -- No --> 310[310 Charge Calculation Subsystem] 310 --> 311[311 Customer Billing Account in Server] </pre> | | | |

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AUTOMATED SOFTWARE METERING OF DIGITAL PAYLOADS

The present invention relates generally to cost metering for digital data payloads, and particularly to a system and method for metering and assessing costs for providing data transmission and security services.

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BACKGROUND OF THE INVENTION

Information exchange mechanisms using the Internet have been available essentially for free to end users, who until the late 1980's were primary members of academic institutions and large companies. As of 1996, good billing models have not been

10 developed for charging end users for Internet data transmission services.

Furthermore, since data transmission security mechanisms are not widely available, there have been no major initiative in developing billing mechanisms that would rely on the end user's machine to perform data transmission cost metering, herein also called postage computation. Specifically, electronic mail (e-mail) is and has been

15 widely available as a free service. No satisfactory billing model exists for charging the customers for this service. However, due to the large bandwidths required for multimedia and value added forms of information services, it may not be possible to maintain quality services without appropriately billing subscribers for the services they use.

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Two significantly different charging models are available from the two conventional predominant mechanisms of information communication;

Mailing services, such as the U.S. postal service and various private courier services, typically bill their customers before providing services. The charges are usually based on the physical distance a package is to be transported, the mail agreements between the countries of origination and destination, the physical weight or size of the packages to be delivered, speed of service, and type of packages.

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Telephony services bill their customers for the time the telephone connection circuits are engaged. Customers are not billed based on the information content transmitted. Telephone services provide options for customers to pay a monthly fee to utilize a certain amount of bandwidth between the two points whenever there is a need. Billing mechanisms for on-demand bandwidth assignment are still being worked out. Higher bandwidth in telephony is needed when a large amount of information is to be transported in a short amount of time.

Facsimile machines provide another method of information exchange that depends directly on telephony service, and thus cost is metered based on the amount of time required for document transmission, the distance between sender and receiver, and the applicable telephone usage rates.

Neither mail services nor telephone services directly base their charges on information content.

Data transmission via the Internet is faster than mailing services and is almost as fast as fax service. Furthermore, it does not provide any degradation of content quality. However, on its own, it does not protect the confidentiality of the material being delivered. Advances in the technology of information encryption and user authentication have substantially lowered the risks associated with stealing information content, making it an attractive alternative to traditional mailing services.

The current billing model used by the Internet service providers is less than satisfactory. It is based on monthly charges or the connect time. These models are neither flexible, nor can they be considered fair to the ordinary user, who may face delays in transporting his information due to problems originating from the service providers.

A secure information delivery service on the Internet could potentially outperform what is currently provided by any courier document delivery service in terms of cost, speed and security. A need is felt for providing the user with a billing mechanism using a paradigm that is already well known and accepted. Preferably, such a system should

5 be fair in allowing for cost computation based on the package size, the level of security provided, and specific billing rules that the service provider can customize. It should also allow the user to review computed costs, for user acceptance or rejection, prior to data transmission.

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SUMMARY OF THE INVENTION

The present invention provides a system and method for dynamically computing and/or assessing costs associated with Internet based content delivery. The content to be delivered can be any kind of electronic document or compound document that

15 may contain various kinds of data, including multimedia data. The costs can be based upon the type of security services provided by the institution or the Internet Service Provider (ISP). The present invention provides the service provider the flexibility to customize their billing rules, and to provide billing rules that are fair to their end users in specific market segments. Computed billing information is dynamically 20 updated visually as the user adds or removes items (content) to and from the payload to be transmitted. This visual update can be presented in several ways to the user.

A preferred embodiment utilizes a cost metering system that has some similarities to the one used by the U.S. postal service, where a weighting apparatus updates a 25 display that shows the postal charges. In the preferred embodiment of the present invention, a digital payload envelope is shown on screen with a stamp (i.e., as an image, such as a bitmapped image). The value of the stamp increases as the user drags and drops more data files onto the payload envelope.

30 A second embodiment applies to credit customers or customers with other kinds of prepaid or charge accounts. In this case, the stamp is accompanied by a second display equivalent to a stamp dispenser that indicates the amount of remaining credit. The customer is able to add data files as long the dispenser can dispense the

stamps. A modified version of this embodiment provides an allowance for an overdraft on the customer's prepaid or charge account.

A third embodiment of the invention provides a C.O.D. (charge on delivery) feature, in

5 which the applicable charges for delivery of a digital payload envelope are deducted from the receiver's account if the receiver accepts delivery of the payload envelope. In this scenario, the receiver will be shown the charges (and optionally a list of the envelope's contents) before he or she is required to accept or decline the envelope.

10 A fourth embodiment of the invention assembles a separate transmittal envelope to assist in the transmission of the digital payload envelope and processing of the delivery charges. In this scenario, the transmittal envelope contains a representation of the information required for the delivery of the digital payload envelope to its intended recipient(s) and the information necessary for processing the delivery

15 charges. The information contained in the transmittal form can also be represented in a bar coded form for automatic display and processing by the sender, any intermediate agent nodes that are authorized to process it, and the recipient(s). The information contained in the transmittal form envelope is made more secure using cryptography techniques.

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BRIEF DESCRIPTION OF THE DRAWINGS

Additional objects and features of the invention will be more readily apparent from the

25 following detailed description and appended claims when taken in conjunction with the drawings, in which:

Fig. 1 is a flow chart for one embodiment of the present invention. It depicts how multiple destinations can be added for the same envelope and how multiple

30 compound documents can be enclosed in the same envelop.

Fig. 2 shows the user interface environment in one embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Figs. 1 and 2 are complementary, and therefore will be described simultaneously. In 301, as soon as an electronic envelope 1000 is opened, the user is identified and a brief summary of his public information is displayed in 1001. At any time, detailed user information can be obtained by double clicking the box 1001. The detailed user information is provided in a pop-up dialog box that does not otherwise alter the operation of this application.

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10 The user at anytime can select the desired quality of service for a particular recipient or everyone on the recipient's list by selecting it from the box 1009. A brief description of quality of service is displayed just below the box 1009. In the shown flow chart, the user selects quality of service in 302. However, he can change it anytime before he sends the payload envelope. Changing the quality of service will 15 typically affect the cost by changing the applicable rate table (sometimes called a rate card).

20 The user can add destinations as indicated by 303 and 304. Unlike conventional mailing services, a single envelope can be sent to multiple destinations. To add a destination, the user simply picks the destination from address book 1015 and drops it into the envelope. To view the details of a destination, the user can select it in the box 1003. The details are shown in the view area 1004. To remove a destination, the user selects the destination in box 1003 and presses the delete key on the user's keyboard. This will only remove the selected destination(s) from the box 1003. The 25 contents of Address Book 1015 are not be effected. Depending upon the billing scheme, adding multiple destinations may increase the cost.

30 The user can add as many compound documents to the payload envelope as he likes as shown by 306 and 308. As a result of each addition of the document, the cost indicator 1005 is updated as indicated in 307. When a document is added, the data type box 305 automatically detects the type of the document and informs the charge calculation system 310 of the type of data. To add a document, the user picks a document from the directory hierarchy and drops it on the payload envelope. The name of the document will appear in the Contents box 1002. The most recent

document will be displayed be default in box 1010. However, the user can select any document in the contents box 1002 to display the contents in box 1010. The compound documents in this application can be of any type or a concatenation of different types, including multimedia documents (shown) that have text (1011), audio

5 (1012), movie (1013) or images (1014). The documents in a payload envelope can also contain source code, executable code or any other type of data.

When the user is satisfied with the contents, destinations, quality of service and cost, he can press the send button 1006 as indicated by 309. The act of sending also

10 seals the payload envelope prior to its transmission. The payload envelope is typically sealed by encryption of its contents, and/or the addition of a digital signature or digital identifier to the payload envelope. The digital signature or identifier is a function of the payload envelope's contents, as well as the identify of the sender. The computed cost is deducted from the Customer billing account of the sender or its

15 designated agent which is maintained on the billing server.

In all of the above, it assumed that the cost is computed using charge calculation system 310, which performs its calculation based on the several inputs it receives.

20 The output of the charge calculation system 310 is displayed in the Stamp box 1005. The billing rules used for incrementing or decrementing the billing amount shown on the stamp utilize several parameters. These parameters include the size of the document, type of document, the type of compression used on the contents, the type of encryption provided for securing the document, the type of services the user subscribes to and the urgency of the delivery. The billing rules may be based on flat

25 rate billing, linear payload size billing, piecewise linear billing, as well as table lookup methodologies.

A flat rate billing rule charges the same amount of money for a digital payload envelope regardless of the state of the billing parameters. A linear payload size

30 billing rule increments the stamp value in direct proportion to the size of the payload. A piecewise linear billing rule allows for different rate values to be assigned to different size ranges as the payload size increases. Additional charges may be added for additional services not included in the basic billing rates, such as for using proprietary encryption techniques instead of public domain encryption techniques.

The service provider can define rules or payment metrics that conform to the service provider's specific needs.

In a second embodiment, for customers with prepaid or charge accounts, the stamp is accompanied by a second display equivalent to a stamp dispenser that indicates the amount of remaining credit. The customer is able to add data files as long the dispenser can dispense the stamps. The prepaid/charge account mechanism can be configured to allow for a predefined overdraft on the customer's prepaid or charge account.

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In a third embodiment, the sender can request that the recipient(s) be charged for the data transmission services, using a C.O.D. (charge on delivery) option. The applicable charges for delivery of a digital payload envelope are deducted from the receiver's account if the receiver accepts delivery of the digital payload envelope. In this embodiment, the receiver is shown the charges (and optionally a list of the payload envelope's contents) before he or she is required to accept or decline the payload envelope. Both the sender and the receiver may optionally designate another node on the network as an agent node responsible for making payments on behalf of the sender or recipient and/or forwarding the digital payload envelope to the recipient(s).

15

In a fourth embodiment, the sender can assemble, in addition to preparing the digital payload envelope, a separate transmittal form envelope. The transmittal form envelope, as part of its contents, includes a representation of the applicable charges and additional fields including sender's identity, sender's address, sender's digital signature, identity/address of each recipient, identity of the digital payload envelope, each transmission's identity/time stamp, quality of service information, comments and instructions for processing the contents of the transmittal form and the digital payload envelopes.

20

In this embodiment, the transmittal form envelope can be processed by the sender, recipient(s) and any other authorized agent nodes participating in the transmission process and/or are involved in ensuring that the computed costs get charged and are paid by the responsible party or parties.

Some or all of the information contained in the transmittal form envelope can also be represented in a bar coded form for automatic display and processing by the sender, recipient(s) and any intermediate agent nodes that are authorized to process it. The information contained in the transmittal form envelope can be encrypted to ensure a

5 securer handling of both the transmittal form and the payload envelopes by the sender, agent nodes, and the recipient(s). In this embodiment, both the digital payload and the transmittal form envelopes can be transmitted together or separately on the same communications channel or on separate channels.

10 In this embodiment, multiple copies or versions of the transmittal form and the digital payload envelope are required depending upon the number of encryption keys being used, the number of recipients, and the number of parties involved in the transmission and charging for the delivery of the contents of the digital payload envelope. This embodiment, additionally, allows an intermediary agent node acting on behalf of

15 multiple recipients, to aggregate and consolidate the envelopes if needed.

WHAT IS CLAIMED IS:

1. A method of cost metering for providing data transmission services, comprising the steps of:
 - 5 accepting user specification of data files to be transmitted;
 - accepting user specification of one or more destinations to which the user specified data files are to be transmitted;
 - accepting user specification of data handling services to be provided in conjunction with transmission of the user specified data files, the user specified data handling services being selected from a predefined set of services that include data compression and data encryption services;
 - 10 computation of a cost associated with transmission of the user specified data files and displaying a pictorial representation of a digital envelope that includes a representation of the computer cost; and
 - 15 upon receipt of a user command, transmission of a digital envelope including the user specified data files.
2. The method of claim 1,
 - debiting the computer cost from a user account upon receipt of the user command.
3. The method of claim 1,
 - wherein the computed cost is a function of the amount of data to be transmitted.
- 25 4. The method of claim 3,
 - wherein the computed cost is a function of the user specified data handling services.
- 30 5. The method of claim 1, further including:
 - assembling a transmittal form envelope, for use in conjunction with delivery of the digital envelope, the transmittal form envelope having multiple fields for storing data representing sender identification, the destinations to which the user specified

data files are to be transmitted, identity of the digital envelope, and the user specified data handling services; and

transmitting the digital envelope and the transmittal form envelope together.

- 5 6. The method of claim 5,
 wherein a subset of the fields of the transmittal form envelope are represented
 in a bar coded form.
- 10 7. The method of claim 5,
 wherein a subset of the fields of the transmittal form envelope are encrypted.

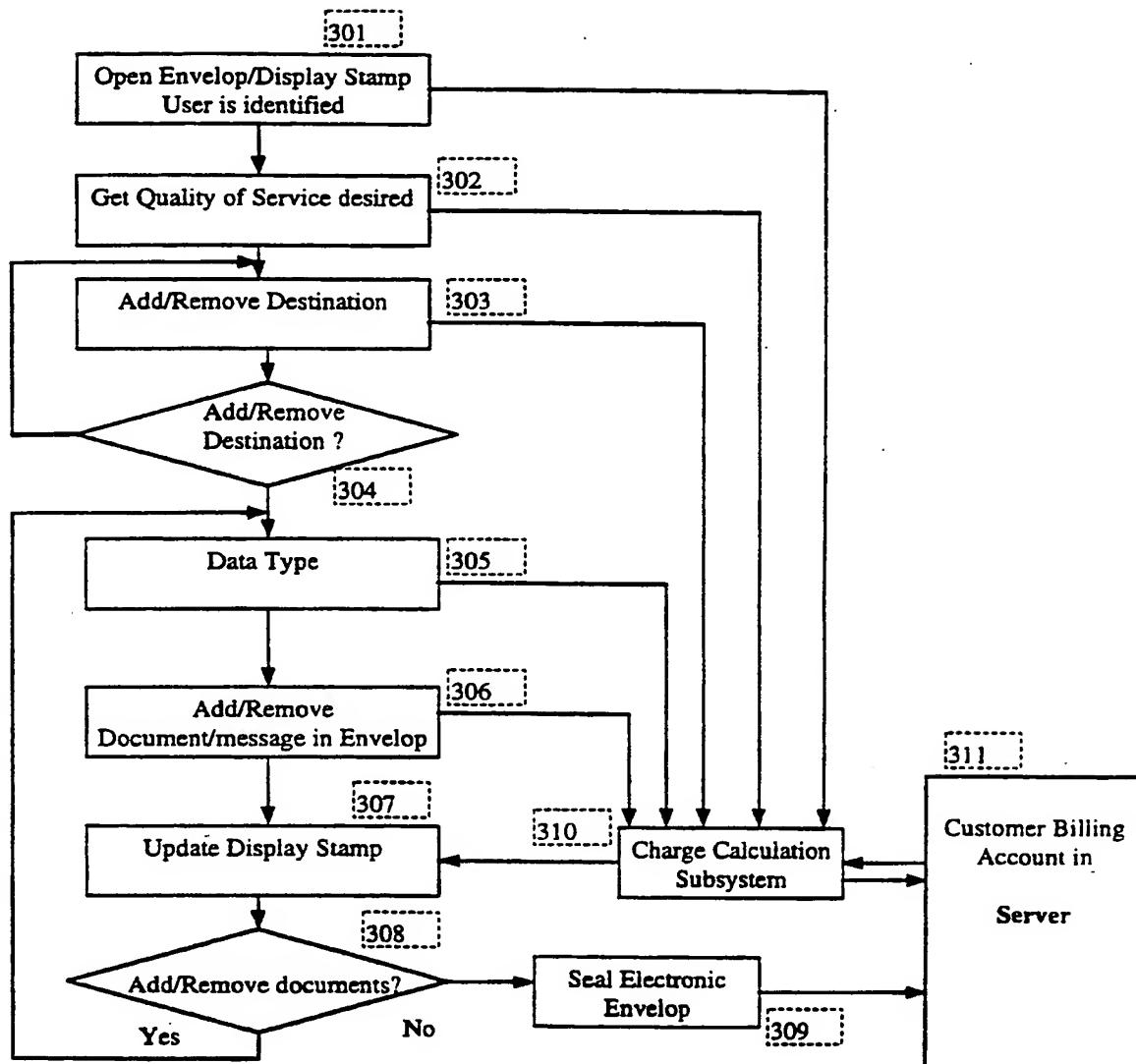


Figure 1

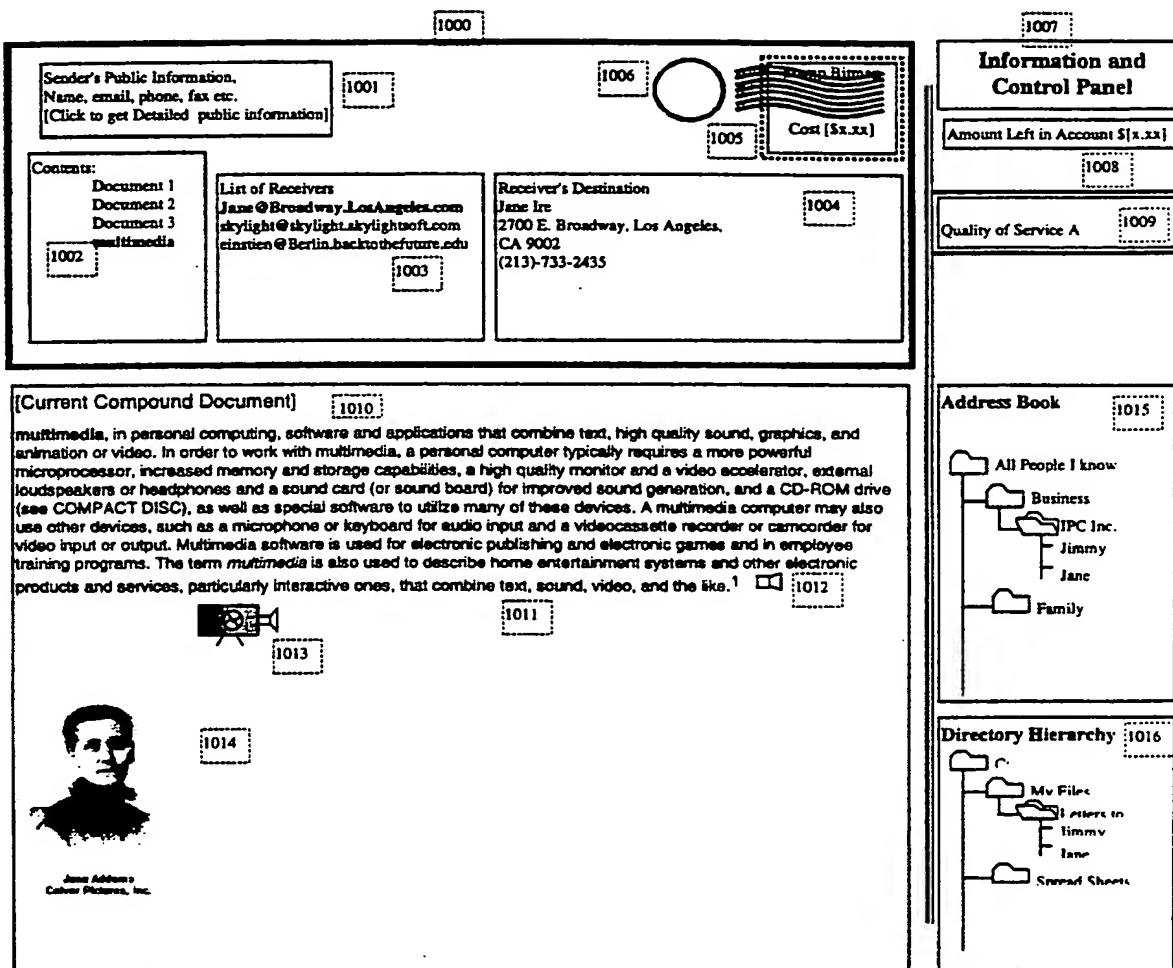


Figure 2

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/04400

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G06F 17/60
US CL :705/400; 705/1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 379/110.01; 705/1, 400; 705/1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

none

C. DOCUMENTS CONSIDERED TO BE RELEVANT

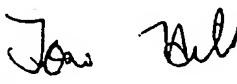
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| A | US 4,827,508 A (SHEAR) 02 May 1989, see abstract. | 1-7 |
| A | US 4,829,443 A (PINTSOV et al) 09 May 1989, see abstract. | 1-7 |
| A | US 4,959,795 A (CHRISTENSEN et al) 25 September 1990, see abstract. | 1-7 |
| A, & | US 4,977,594 A (SHEAR) 11 December 1990, see abstract. | 1-7 |
| A, & | US 5,050,213 A (SHEAR) 17 September 1991, see abstract. | 1-7 |
| A | US 5,359,508 A (ROSSIDES) 25 October 1994, see abstract. | 1-7 |

 Further documents are listed in the continuation of Box C. See patent family annex.

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
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| A, & | US 5,410,598 A (SHEAR) 25 April 1995, see abstract. | 1-7 |
| A | US 5,487,100 A (KANE) 23 January 1996, see abstract. | 1-7 |
| A, E | US 5,768,521 A (DEDRICK) 16 June 1998, see abstract. | 1-7 |
| A, E | US 5,771,289 A (KUZMA) 23 June 1998; see abstract. | 1-7 |